

AMENDMENT TO THE CLAIMS

Listing of Claims:

Claim 1 (Withdrawn):

Claim 2 (Withdrawn):

Claim 3 (Withdrawn):

Claim 4 (Withdrawn):

Claim 5 (Withdrawn):

Claim 6 (Withdrawn):

Claim 7 (Withdrawn):

Claim 8 (Withdrawn):

Claim 9 (Withdrawn):

Claim 10 (Withdrawn):

Claim 11 (Currently Amended): In a cam apparatus having first and second spiral cam grooves for moving an object with a cam-driving force which is generated by cam-driving a cam groove inserting member inserted in each cam grove, a cam apparatus comprising:
a cam base body having a generally cylindrical middle portion and first and second in which sliding portions formed at both ends of said middle portion and said sliding portions having a smaller diameter than that of said a middle portion of a cylinder are formed at both ends of the cylinder, said cam base body further comprising an approximately vertical plane of a first stepped portion forming and approximately vertical plane between one said first sliding portion and the said middle portion of the cylinder is defined as one thereby defining a cam plane of the first spiral cam groove and an approximately vertical plane of a second stepped portion forming and approximately vertical plane between the other said second sliding portion and

~~the said~~ middle portion of the cylinder is defined as ~~one~~ thereby defining a cam plane of the second spiral cam groove;

a first cam frame having another cam plane confronting ~~the one~~ said cam plane of the first cam groove and provided non-rotatably so as to be able to slide on ~~one~~ said first sliding portion;

a second cam frame having another cam plane confronting ~~the one~~ said cam plane of the second cam groove and provided non-rotatably on the ~~other~~ second sliding portion ~~non-rotatably~~ so as to be able to slide; and

a forcing device which connects ~~contacts a cam groove inserting member which is inserted to the cam groove formed by the first and the second cam frames and the cam base body on to the cam plane by pressing~~ the first and second cam frames to the cam base body; and

cam groove inserting members, each of which is received within one of the first and second spiral grooves.

Claim 12 (Currently Amended): A cam apparatus according to claim 11, further comprising an adjusting mechanism which adjusts a distance between the ~~one side~~ confronting cam planes of each of the first and the second cam grooves.

Claim 13 (Currently Amended): A cam apparatus according to claim 11, wherein a ~~slope is provided on~~ at least one of the confronting cam planes ~~of the one cam plane and the other cam plane~~ at least one of the first and the second spiral grooves is sloped, and wherein the sloped cam plane ~~the slope is a slope which~~ gives a cam driving force along a direction of the rotational axis of the cam groove and pushing force along a direction orthogonal to the direction of the rotational axis of the cam groove to the cam groove inserting member.

Claim 14 (Currently Amended): A cam apparatus according to claim 11, wherein ~~a~~ the forcing device is fastened at one end for fastening to tighten one end of the forcing device to the first cam frame and at another end to the second cam frame and ~~the a forcing device for pressing~~ presses the first and the second cam frame to the cam base body along one direction.

Claim 15 (Currently Amended): An optical zoom mechanism comprising:

a zoom lens;

a holding frame which holds the zoom lens;

a rotational axis rod having gears at the both ends thereof;

a first group of rate reducing gears which engage the gear at one end of the rotational axis rod;

a second group of rate reducing gears which engage the gear at another end of the rotational axis rod;

a motor which drives the second group of rate reducing gears; and

a cam body driven by the first rate reducing gears, the cam body having at least one spiral cam groove formed by confronting cam planes; and

a cam groove inserting member provided on the holding frame,

wherein the zoom lens is driven by inserting ~~a~~the cam groove inserting member ~~provided on the holding frame~~ into ~~a~~the spiral cam groove of the cam body, ~~the cam body comprises one cam body which forms one cam plane and another cam body which forms another cam plane, which is provided non-rotatably so as to be able to slide and which forms another cam plane confronting the one cam plane, and the cam body further comprises a forcing device which contact the cam groove inserting member to the cam plane by pressing one cam body and/or another cam body, and~~ whereby zooming is performed by moving the holding frame with the cam body.

Claim 16 (Canceled): An optical zoom mechanism according to claim 15, wherein the cam body comprises:

a cam base body having a first spiral cam groove, a second spiral cam groove, a sliding portion having a smaller diameter at both ends of a cylinder, one cam plane of the first cam groove which is provided at a stepped portion between one sliding portion and the middle portion of the cylinder, and one cam plane of the second cam groove which is provided at a stepped portion between another sliding portion and the middle portion of the cylinder;

another cam plane confronting the one cam plane of the first cam groove;

a first cam frame provided non-rotatably so as to be able to slide on the one sliding portion;

another cam plane confronting the one cam plane of the second cam groove;
a second cam frame provided non-rotatably so as to be able to slide on the other sliding portion; and further

a forcing device which contact a cam groove inserting member to the cam plane by pressing the first cam frame and the second cam frame, the cam groove inserting member inserted into two cam grooves which formed with the first cam frame, the second cam frame and the cam base body.

Claim 17 (New): The optical zoom mechanism according to claim 15, wherein the cam body further comprises:

a cam base body having a generally cylindrical middle portion and first and second sliding portions formed at both ends of said middle portion and said sliding portions having a smaller diameter than that of said middle portion, said cam base body further comprising a first stepped portion forming and approximately vertical plane between said first sliding portion and said middle portion thereby defining a cam plane of the first spiral cam groove and a second stepped portion forming and approximately vertical plane between said second sliding portion and said middle portion thereby defining a cam plane of the second spiral cam groove;

a first cam frame having another cam plane confronting said cam plane of the first cam groove and provided non-rotatably so as to be able to slide on said first sliding portion;

a second cam frame having another cam plane confronting the said cam plane of the second cam groove and provided non-rotatably on the second sliding portion so as to be able to slide; and

a forcing device which connects the first and second cam frames to the cam base body.